

Laboratory Protocol for Evaluation of Trigger Locks and Documentation of Results

Introduction

This document was developed for use in evaluating clamshell-type trigger locks for guns. These locks typically are split into two halves and clamp to the trigger guard of a gun, with a post passing through the trigger area that connects the two halves of the “clamshell” as shown in Fig. 1. Most trigger locks are opened with a key, but some employ a combination lock. Others are not locks at all but are opened and closed with a simple screw, and some may employ a combination of devices. Within the basic design, the different types of locks are constructed from different materials, from cast pot metal to lightweight plastic.

The procedures outlined below are not intended to constitute a definitive test of all the aspects of trigger lock effectiveness and reliability. The criteria employed do not provide “pass” or “fail” results for the individual locks. The intent of this protocol is to provide a subjective evaluation of whether a lock will allow easy access to the gun on which one of these locks is attached. Laboratory evaluations were conducted following these procedures, which were derived from the protocol for cable locks described elsewhere. The evaluations were initiated upon discovery that some commonly available trigger locks could be removed from a gun simply by dropping the locked gun so that it struck on the side projection of the lock. The purpose of this evaluation procedure is, therefore, to determine approximately how easily various trigger locks may be opened by means other than the intended use of their keys or other locking mechanisms.

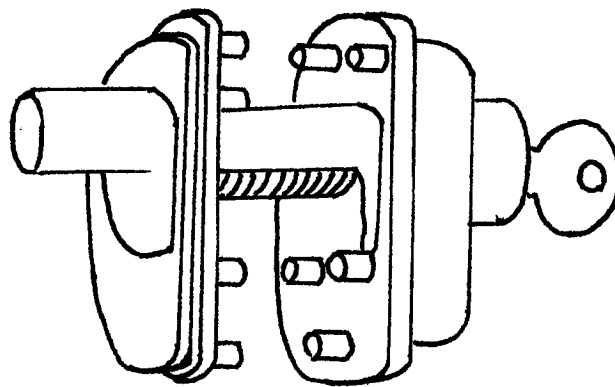


Fig. 1 Typical “Clamshell” Type Trigger Lock

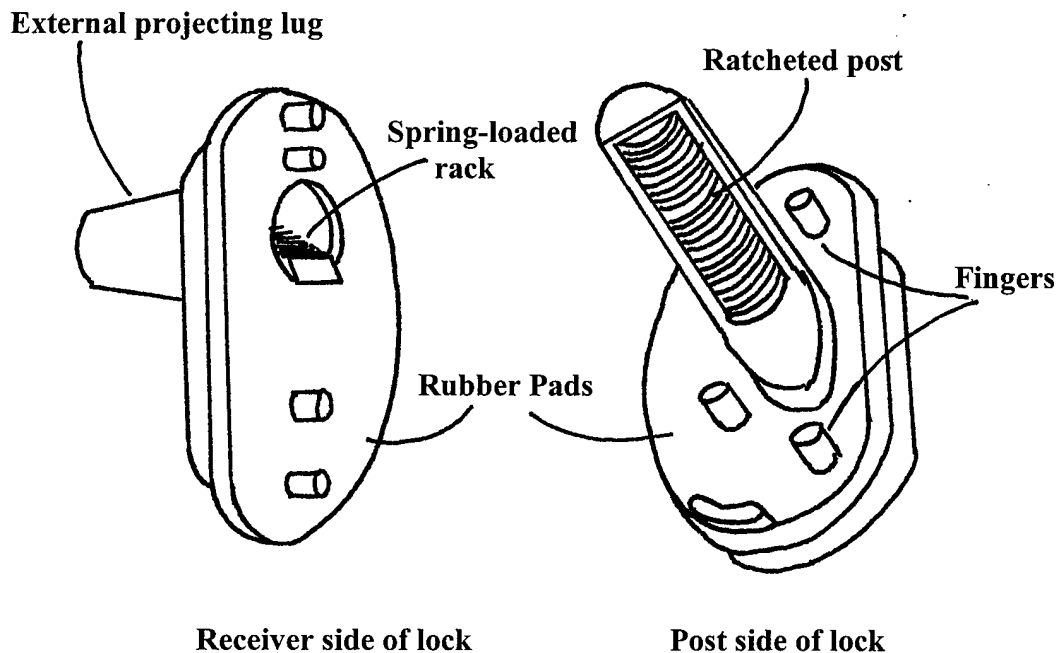


Fig. 2 Typical Configuration of Trigger Lock

1. External Examination

Examine the lock to determine which direction the spring-loaded rack moves when the post is inserted into its socket. In Fig. 2, the rack moves vertically downward as illustrated. Note the direction of spring-loaded rack travel, or mark the appropriate surface of the external projecting lug. In the example illustrated above, the bottom of the projection lug would be marked to denote the fact that the rack moves downward. This will determine the reference orientation of the lock in the testing to be performed later.

Procedure 1 – External Examination

Record the manufacturer and model of the test sample. Photograph each test sample, and record the following physical characteristics of the sample:

- shape, color, labeling, markings
- gross size characteristics such as overall length and width, distances between the edges of the lock and significant lock structures (post, secondary fixed posts, etc.)
- the length of the post
- the number of the teeth on the post and spring-loaded rack
- the minimum and largest distances between the clamshell halves of the lock when all teeth of the spring-loaded rack are fully engaged with the teeth on the post
- the number, types, and heights of “fingers” on the inside of the clamshell halves of the trigger lock

- Other unique features intended to block the trigger, or prevent movement of the trigger

Procedure 2. On-the-Gun(s) Tests

Procedure 2a. General Fit

Three different handguns were used in laboratory testing to determine the fit of the trigger lock to the gun. They were chosen as being representative of commonplace handguns.

1. 9-mm semiautomatic
2. small .38-caliber revolver
3. .32 caliber revolver

A subjective evaluation of the general fit of the trigger lock to the gun is determined and recorded. This is done by determining whether or not the trigger lock:

- Blocks the trigger (post fits behind trigger)
- Blocks access to the trigger
- Allows full engagement of the spring-loaded rack of teeth with the post teeth
- Prevents by design or fit the sliding of the trigger lock along the trigger guard

In evaluating the trigger locks, one lock from each sample should be placed on each of the test guns. With the lock secured to the gun, measure the separation distance between each half of the lock at the same points where measurements were taken earlier with the post fully inserted. This is done to determine whether or not the teeth on the spring-loaded rack are fully engaged with the teeth on the post. Note that some locks can not be mounted with the post behind the trigger on some guns. Some guns do not have free triggers, preventing any lock from being installed behind the trigger. Some guns have a broadened case at the top and/or rear surface of the trigger guard, making fit difficult. Record the data related to the general fit of each sample lock on each gun in a table.

All of the following tests are performed using a gun on which the lock fits by blocking the trigger with the post. The locks are assembled on the gun with the post behind the trigger.

Procedure 2b - On-the-Gun Drop Test

Performance of this test involves dropping a gun fitted with the lock against a steel anvil. The gun is loosely strapped to a carriage and support that is guided in vertical free fall. The strapping allows rotation of the gun and lock away from the anvil so that relatively little of the fixture's inertial force is transmitted through the attachment to the handgun/lock assembly on impact. The lock case strikes the anvil on the projection that contains the spring-loaded rack of teeth.

The primary direction of impact is intended to rotate the spring-loaded rack away from the teeth on the post (See Fig. 3). The locks are tested by dropping them 3 times each from heights of 24 and 36 inches. Measure the separation distance between the lock halves after each drop from a given height. Note if the halves of the lock separate completely, or if they separate enough to expose the spring-loaded rack of teeth to allow mechanical "picking" of the lock. Record the results of this test in a table.

Differences in the designs of different locks may affect the way the locks loosen when impacted. Some locks may loosen more readily when impacted as illustrated. Some may loosen more readily when impacted in the opposite direction, but others may show no difference when the impact is directed in the opposite direction. Therefore, subsequent drops may be chosen so as to impact the case in the direction opposite of that shown in Fig. 3 to determine if this results in the lock opening.

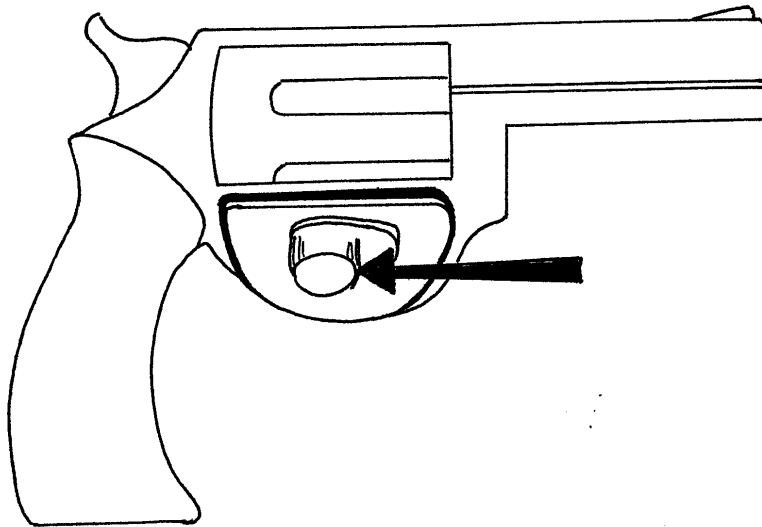


Fig. 3 Trigger Lock on Revolver Showing Primary Location and Direction of Impacts

Procedure 2c – Hammer Strike

This test is conducted by striking the gunlock with a 16-ounce hammer while being held by the evaluator. This test is subjective in that the location, direction, and force of the impacts are variable and controlled by the operator. The intent is to be as consistent as possible, not only within the test of a single lock, but between tests of different locks as well. The same operator should be used for all tests, and to the extent possible, all tests should be conducted at the same time to try to assure repeatable results.

The lock should be impacted in the same general location and direction as those selected for the drop tests. Up to 10 hammer strikes can be performed, with the separation distance between halves of the gunlock monitored after pairs of hammer strikes. Record the results in a table.

Procedure 2d - Leverage Test

This is a demonstration test to illustrate the ease or difficulty of removing the lock by prying it from a gun. As with the hammer strike test, this test is subjective in that the operator controls the prying forces. Install the lock on a gun. Using a flat-bladed screwdriver (10 ½- inch total length), attempt to remove the lock by prying it from the gun. The prying forces should be applied between the clamshell halves of the lock in a direction intended to move the spring-loaded rack of teeth away from the teeth on the post. The separation distance should be measured before the start of the test and at 30-second intervals during the test. The test should be continued until the clamshell halves of the lock separate, or for at least 2 minutes if separation does not occur. The test operator should make a subjective assessment of the difficulty of removing the lock from the gun. Record the results in a table.